Menlo Park Notebook #34 [N-79-03-25]

This notebook covers the period March-June 1879. Most of the entries are by Edison and Charles Batchelor. There are also entries by Francis Upton and John Kruesi. All of the material relates to either electric lighting or the telephone. The electric light material includes notes on coatings for metal filaments; drawings of lamps; notes, drawings, and calculations about generators; and drawings and calculations about electric power distribution. The telephone material includes notes, drawings, and tests of the electromotograph receiver; notes and drawings of a central telephone exchange system; and notes on parts and prices of telephones. The book contains 284 numbered pages.

Blank pages not filmed: 110-111, 146-147, 152-153, 170-189, 206-207, 210-217, 220-225, 252-281.

No 34

LIBRARY OF THE

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120 BROADWAY, NEW YORK.

March 25 1879—

Chas Batchelor

Pyro-Insulation for Platinum wire

1 Nitrate of Barium put on the finger and the wire rubbed through it a very little sticks to the platinum but not enough to make good insulation

2 acetate of Magnesia makes very good coating but we want it thicker than ~~this~~ we get this and easier to put on. The acetate feels a little soapy and sticks well to the platinum. It is very pliable even with a coating of .003 on a .005 wire

3 Nitrate of Magnesia goes on very easily but very rough and when wound on spool it seems

March 26' 1919 Page 3

Chas Batchelor

to break off on top side showing the platinum underneath entirely free from coating. Thus it is a platina wire with a loose coating on. We got this on as thick that a .005 wire coated measured .010 this when wound on spool and heated in vacuum gave the best light we have had from our small experimental lamps.

---

4 Tungstate of Soda.

Is difficult to get on and only hardens in globules on the wire which cannot be easily taken off without drawing them off the end of the wire, what does get on the wire is almost transparent

---

No 3

When heated to incandescence it was the best we have had of this size (about 8 candles) afterwards Edison busted it and under the microscope it looked as if it had been torn

Mch 26th 1879

5 Acetate of Lime - Charbatchelor

This coats the wire very beautifully and exceedingly fine; but the lime seems to combine with the Platina the coating is so fine that 100 coatings would not make a .005 wire more than .00575 thick.

6 Nitrate of Lime is a very fair one but too lumpy and takes too long to put on smooth; as in taking off the lumps it removes the rest. Made no spool of this as yet

7 Nitrate of Magnesia + Acetate of Magnesia

This makes good and thick coating the acetate making it stick to the Platina and the Nitrate thickening it. We made a spool of this and

Asunder and in some parts globular and in others it appeared to have volatilized and left the core spongy. Some parts showed Iridescence

7 will try it; when on the spool it shows no cracks and coats very thick at .010

8 Chloride of Calcium
No good. burns on hard and very irregular and moreover attacks the Platina

9 Aluminic Nitrate (Sat.) with a little free Acetate in
goes on pretty thick but cracks a little when wound. This could be easily overcome by allowing them to be wound damp and when heated first time in a vacuum it would dry in its place. .005 wire covered with this easily comes up to .010

March 26 1849
Chas Batchelor

Chas Batchelder

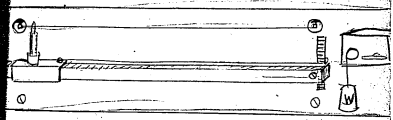
10 Acetate of Zinc

not good. when on it feels like soapstone and comes off with slightest touch

Nitrate of Aluminum No 9.

when heated and after heating in vacuum looks under the microscope as if the wire had expanded and the covering had not and the wire had broken the covering so that it seemed to be made up of bone ferrules about equal length

Covering Wire (Machine) April 1st 1849 Chas Batchelor



- Candle carriage adjusts up and down to suit the flame
- Candle drawn by clockwork (for copying) by friction so that when ~~down the~~ it has gone once over it can be pulled back.
- Must be made on bracket & screw on edge of a shelf or table

Chas Batchelor

Chas Batchelor

April 1st 1879

Chas Batchelor

In our experiments with the small spools we find when we fuse them they always give out at the bottom

May be due to point of greatest potential

9 pm

Make a spiral of .020 thickness

Platinum
Copper
Aluminium
Steel
Iron
Chem. pure Iron Made

for Glass-
Blower to seal
in bulbs

Made
3 of Platinum
3 of Pure Iron ordered drawn
3 of Drawn wire ordd
3 of Copper
3 of Aluminum
3 of Magnesium
4 of Nickel ordd.

April 1879

Make specials for Vacuum
4 10/ Iron Platinum

4 '010 Pt Ind. 10/
4 '010 Pt. Ir 24/
4 '010 Pt Ir 20/ with Mag
4 '005 Pt Ir 20/.
4 '005 Pt Ir 25/ Not Mag

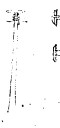
Make-
2 Lime cylinders 2 layers

'005 Pt. Ir. 24/
+ Insulation '012
brought up in hand pump
first.

April 1899

Make 2 Instruments for testing spools, glass tube made out of battery bottles

Make platinum silver ~~on~~ corrugated diaphragm & hood built [illegible]

Take 1 Anschütz instrument [illegible]

D. Apatite
Tur
Oct 6 '79

Sand mixed with 40 parts of Tur to 100.

Covering and all. 013 when wound on the spool this breaks all up so that you can see the features —

Think I made (3 pcs) to mix Nitrate of Magnesia and Sodium Picrate & Glycerine strike in water & stir with iron and cook so that it would hold the nitrate covering together

April 4 1879

12 Noon Put the leaves used in bottle containing Chloride of Calcium solution and connected them to the cell of Daniels battery to see whether it would react on its neutral

12 Noon Put Lead Chromium in boiling Sulphuric Hydrogen to see if it would dissolve

April 7 1849

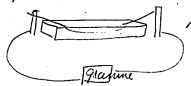
12 noon Put a piece of platina wire in Chloride Magnesium with battery in to see if it would oxidize on it

T A S

April 4th 1911

Coating Platinum Wires

Try.



Acetate Mag Solution
Keep wire hot with
Gramme mael

Try Coating the ~~&~~ Tow covering of Acetate of Magnesia with rubber dissolved in Benzine to make pliable in winding

April 7. 1899

Platinum Impoverishment

Deposit from Chl calcium or Chl Magnesia by battery

Chloride Mag. Solution on Gramme machine with about 60 ohms resist. deposit very thick on one wire, looks crystalline in form full of cracks — when dried it cracks by contraction so that it leaves large spaces in between

Chl Calcium work better apparently from Coating dont crack but when bent + rubbed comes off completely perhaps a coating of rubber would do this good

Apl 7 1879

Platinum Pyrosimulation

Try amalgam of Mg. and Hg
Volatilizing Hg with Heat

Try rubbing metallic Ba & Mg
on wire

Apl 4 1899

Suspend wire in boiling Carbonate of Magnesia or any salt of Mg. and see if it becomes coated internally

Make a piece $\frac{9}{1000}$ thick straight and bring to incandescence and see if it cracks when winding on a $\frac{1}{8}$ mandril

OK. this is the best yet ~~Spoke~~ bringing to incandescence ~~and~~ causes it so that it looks solid and hard and crystalline it bends easily without cracking on $\frac{1}{32}$ mandril but it seems to ~~be~~ ~~a~~ ~~bit~~ platinum bad I must get something that won't

Make a split mould with $\frac{1}{1000}$ hole put wire put wire through and stretch filter water through Repeat mould hot

Cover wire to $\frac{1}{100}$ and leave with ribbon fibre & wind the heat will cut off the fibre and leave wire and covering on loose

Coöum Dmds

Mix Magnesia with Rubber dissolved in Benzine in variable proportions

Mix Magnesia with Gutta Percha dissolved in Chloroform & Coal

Try plaster of paris on a wire and note shrinkage

Coat silk fibre with MgO by dipping in alcoholic solution of same and Croc wire regular way.

Mix Carbonate of Baryta and rubber in Benzine and coat iron by great heat it fuses & coat covered slag. non conductor

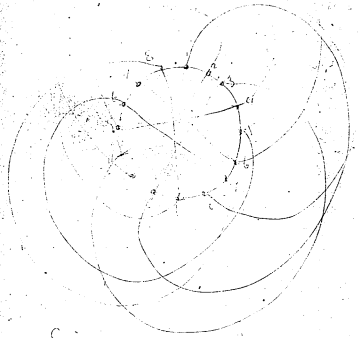
Coat with very fine ~~pipe clay~~ and ~~Fire clay~~ ~~clay fine~~ mixed with Mg O.

43

Goat Silk fibre with pipe clay and Mg O. laid up in usual manner

Deposit from Sulphate of Mg O.

No good too fluffy



Diagram

Apl 7 1919

Try Alcoholic sol of Mg O for coat, bring up in Vacuum before bending.

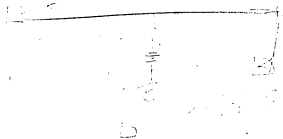
This is good, it is a little different to put on and it breaks up by contraction a little however there are not bad faults and can be got over but it still eats into the platina

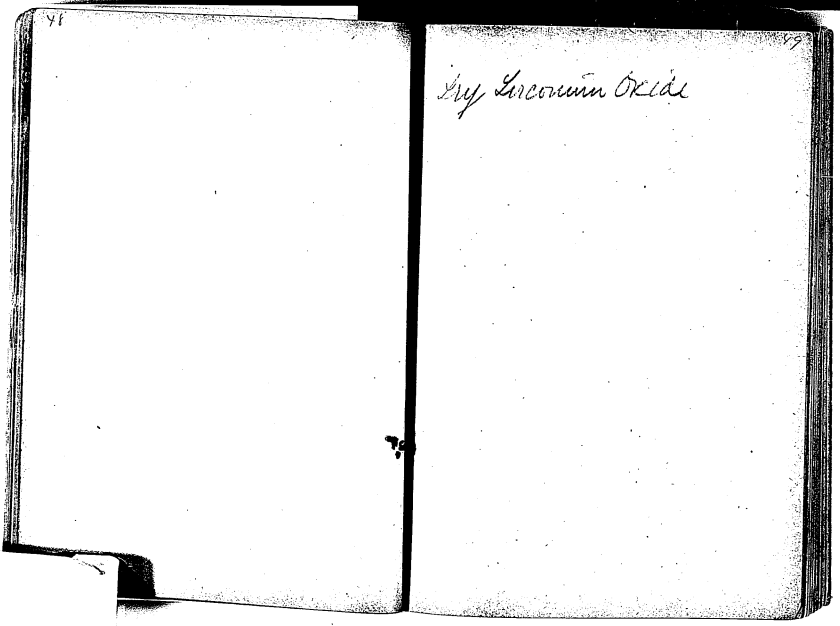
Try Alcoholic Solution of Butter for coat bring up in Vacuum before bending (Kitaninin)

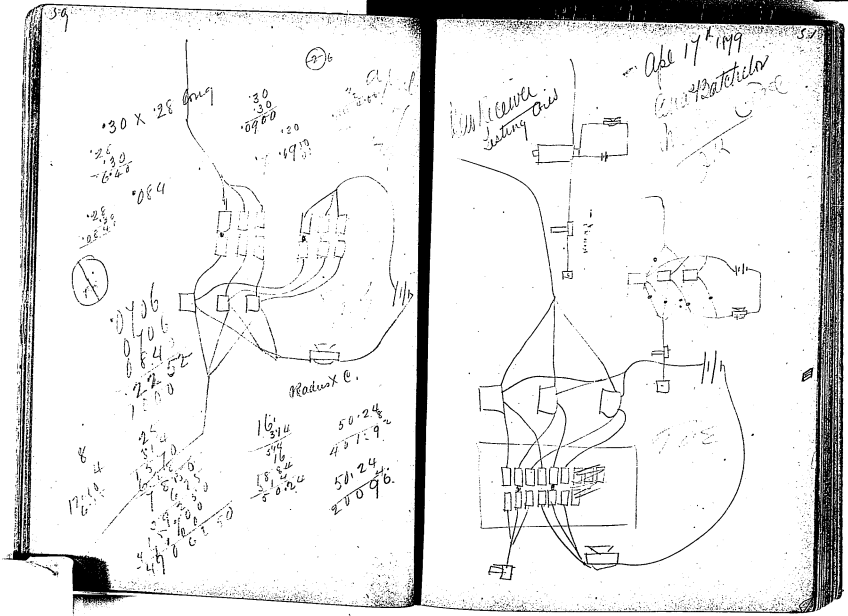
Chas. Batchelor

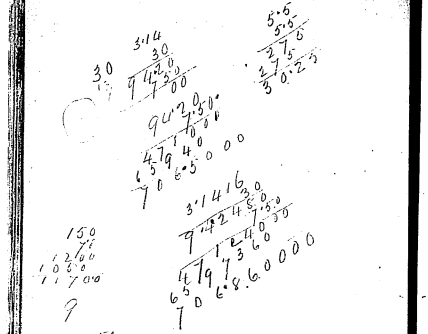
F.B.

Cerium Oxide + Oxalate









New Receiver. April 18th 1919

Made 2 coils for new receiver & compare with our original coil; our original coil is as follows:—

original coil Length 4½ inch
Thickness
No 1. Primary 4 layers of #19 resist .40 ohms
Secondary 9 layers of 32 resist 1.50 ohms

No 2. Length 2½ inch
Thickness
Primary 6 Layers 18 resist .35 ohms
Secondary 14 Layers 32 resist 1.57 "

No 3. Length 1⅜ inch
Thickness
Primary 4 Layers 19 resist .22 ohms
Secondary 9 Layers 36 resist 1.64 ohms

·09
·0706
·0706
·2312

·3
·3
·09

·30

Electric Light April 16 1879

Surface of Spool

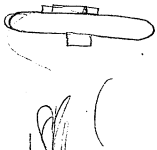
·3 X ·3 = ·09 + ·0706 + ·0706 =

·2312 square inch

This has ·010 wire on it covered to ·0145 and it held 10 feet 4 inches of wire = 1 ohms

54

Rondo Pent



Sharon

500000

12

14.

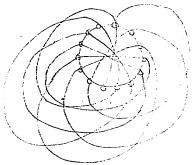
500000

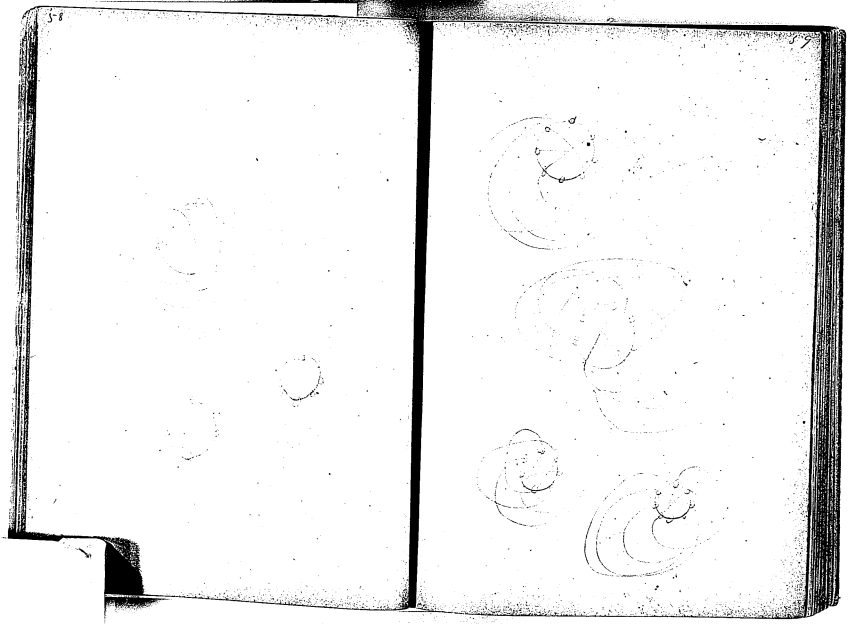
100.000000.

Make field magnet

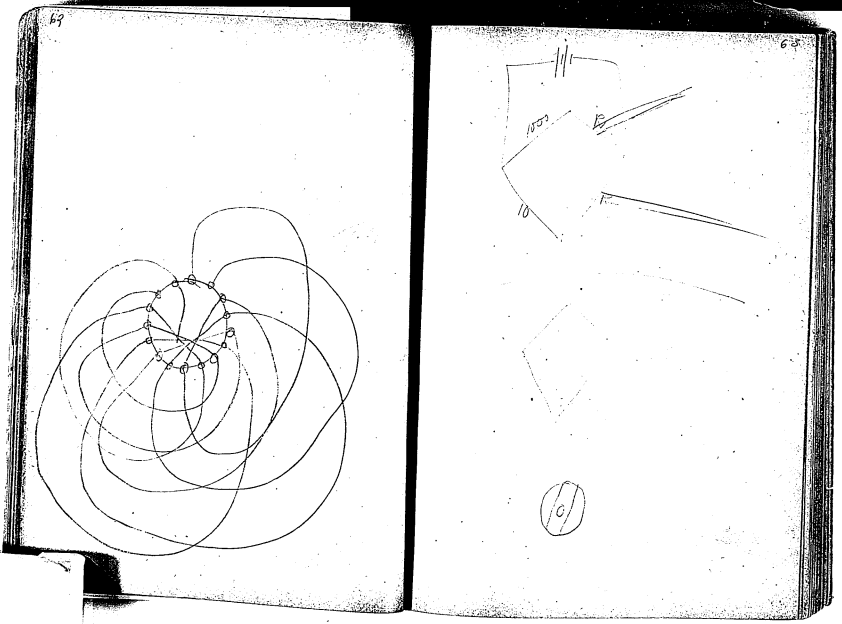
075 ohms

5 inch long + 1½ thick





60
61


69
69
10
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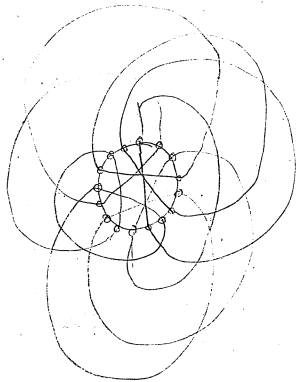
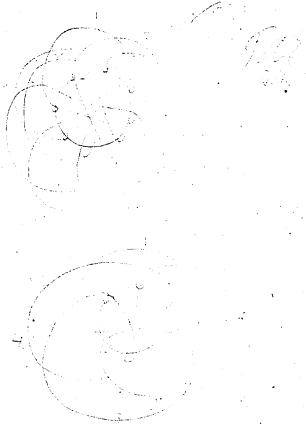
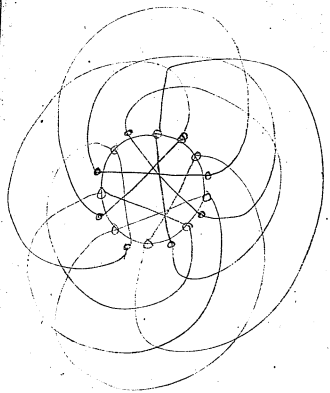
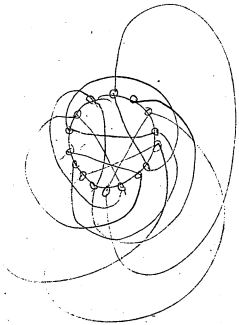








100. 15

60. per 100 ea.

6

24,000.

2,400,000.

400,000

2,400,000

1,650,000.

250 cap. 3

30, 150 3,950,000.

10 225

6000. 9

8000. 4

2,000,000, 1000, 3000,

5 250 cap. 4 hrs

1,350,000

Light

60. 225 2839 Kup

24

11356

13678

148136

100 1,400

1000 4000.

148 136

6

Light

2,300,000 1,333 888816

160,000 cap

4000 = Mosha

166

24

664

332

3984.

35

24. 4000 | 166 2/3

240

160

144

160

144

16.

16% mosha

of Co station

16%

11.69

16% 3.9

400 000 lights will require if 100 lights per machine, 4000 machines each using 350 per machine 1.400,000 - requiring 68.000 horse power, in 24 stations 2833 hpower in each. cost of this - power for 4 hours $ 2:720. Total Cost plant 6,000 000, interest at 10pc, 600,000 yearly

Interest. 600 000
Power etc. 992,800
1,592,800

Bypass. Consumers wanted hours in 4 hours at 4 feet per hour. 6.400 000 at 2 per M. $ 13 000 nightly or in year. 4.745.000 if at 1 per M. 2.372,500 at this price our cost 1 592 800
our profit at 779700 $1. per 1000

400
100
40,000

4000
100
400,000

1.600.000
4
6,400,000.

350
4000
1,400,000

365
13000
365
65000
78000
34000
4745000

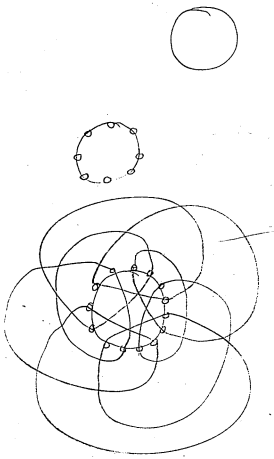
17
4000
24) 68.000 (2833
48
200
192
080
72
8
72

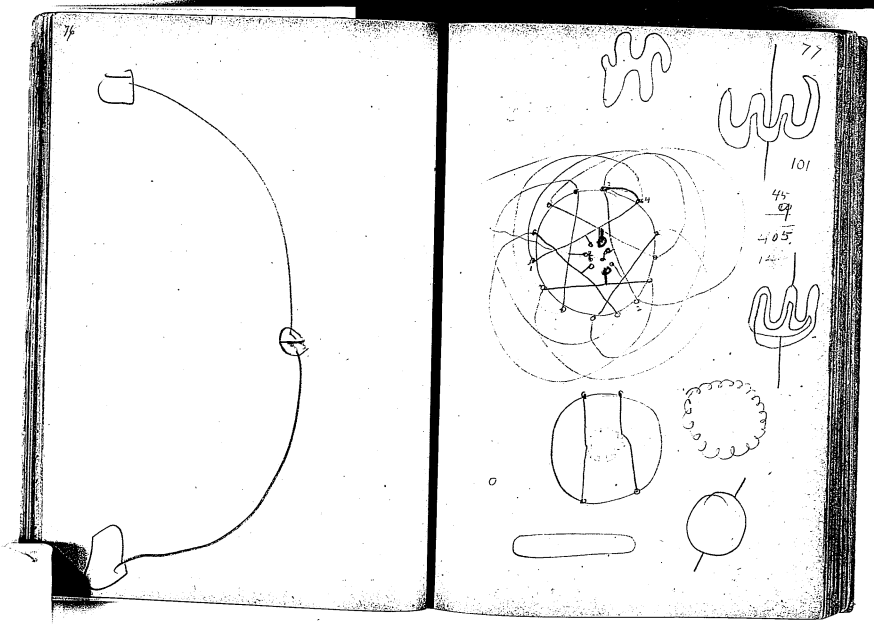
2720
365
73600
16320
8160
992800

17) 68.000 (680.
6 8
8 0
8 0
0 0 0

680
7
2720

2 material on




76
77
101
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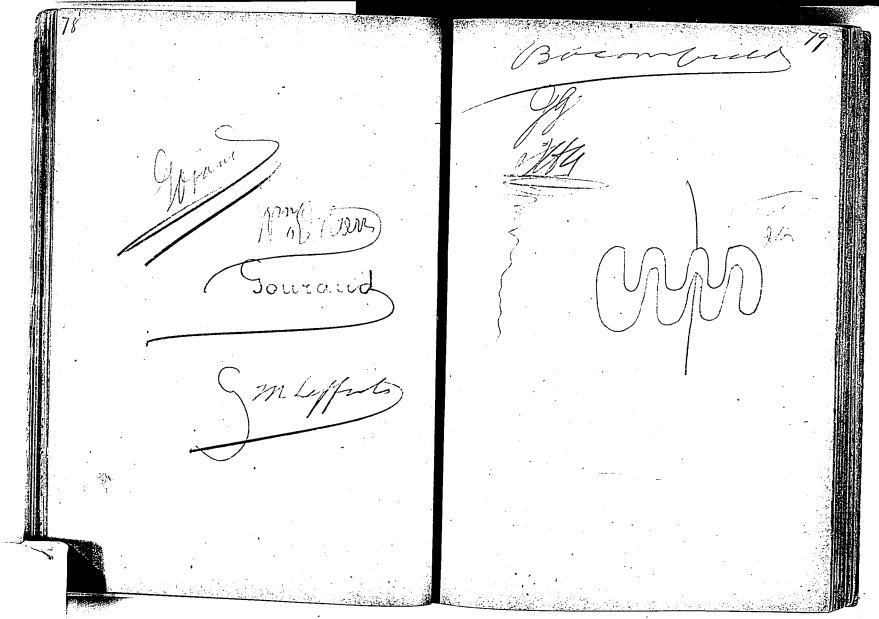
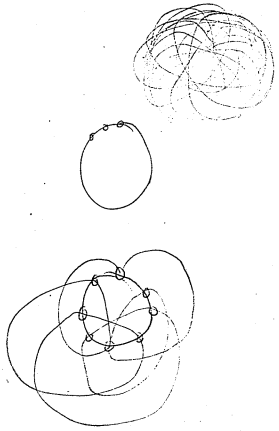
9
405
12



229.

229



20.
20
400

100
100
10000

2 ohm = .4. hp.

100 $\frac{1}{4}$ 10

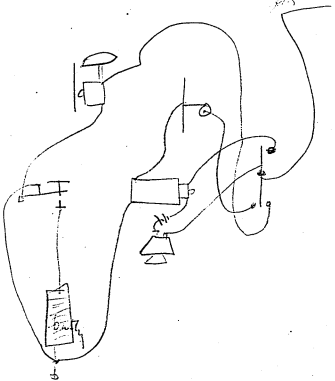
6. 400. 100.

3 hp. 2½

1.

1500
25
75 00
3 00
3 75 00 01

April 1894



15 2
30 1
6

24. 1 2
2 1
4 1/2
8 1/4
16 1/8
32 1/16.

1/4
1/8
1/16

32
15
160
32
48

1/16. .16 .25

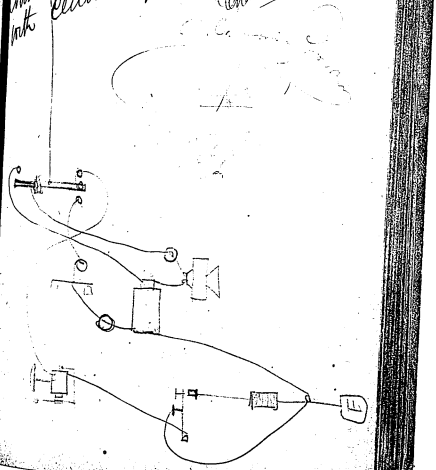
32

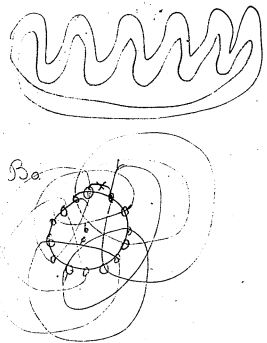
100.

1/4 ohm

1/18 100.

Edison Telephone
Connection for station working
with central system May 1st 1879
Charles Batchelor

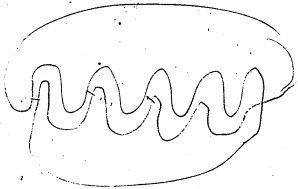


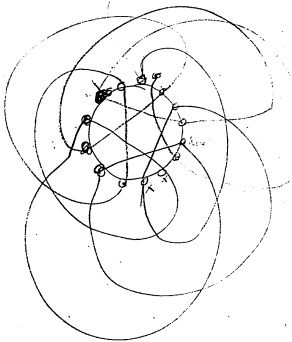


142	20 − 5		.15
12344	37 − 5	17	32
1466	55 − 5	18 − 5	0
1468	72 − 5	17	67
14610	86 − 5	13	81
14612	96 − 5	10 −	91
14614	106 − 5	10 −	101
14616	113 − 5	7 −	108
14618	116 − 5	3 −	111
14620	117 − 5	1 −	112
14622	115 − 5	− 2	110
14624	110 − 5	− 5	105
14626	105 − 5	− 5	100
14628	92 − 5	− 13	87
14630	80 − 5	− 12	75
14632	64 − 5	− 16	59
	71 − 5	+ 7	66
36	89 − 5	− 18	84

14

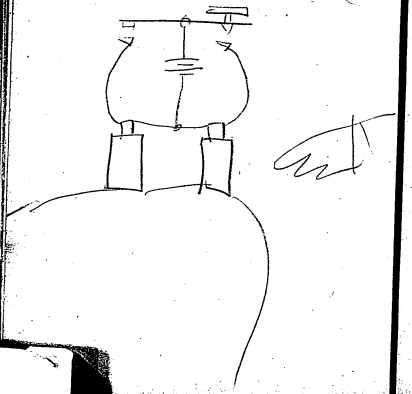
38	108 − 5	103
40	130 − 5	125
42	145 − 5	140
44	164 − 5	159





Telephone Call May 19 1879

Alexander Graham Bell



Reversing battery Coil 1800 ohms
with opening only 6000 ohms
had to bias it as opening
only worked it.

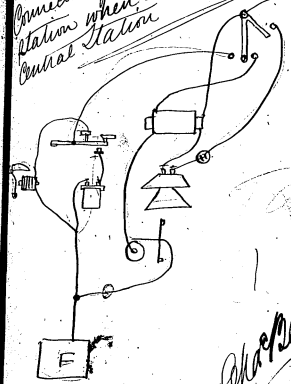
Double Coils 4600.

Limit

Earth

Edison Telephone
Connections for each
station when worked with
Central Station

May 1st 1891

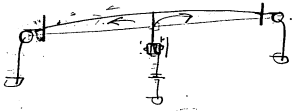


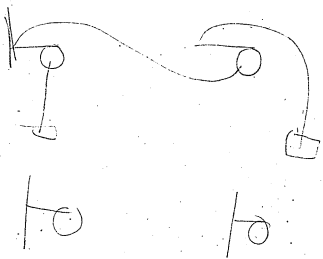
Chas Batchelor

Edison Telephone
Central Station battery

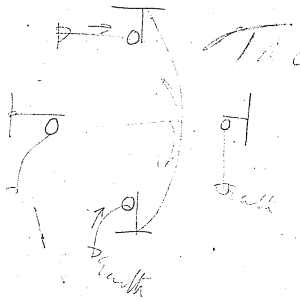
May 1st 1879

Charles Batchelor





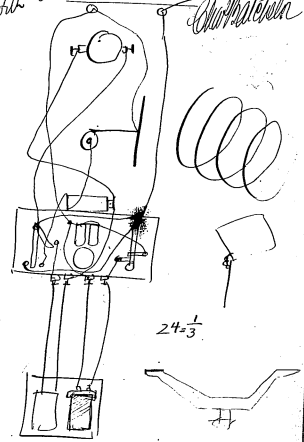
May 1877



Edison Telephone
Connections for station
working with central system

May 1st 1879

Blue Pencil Sketch



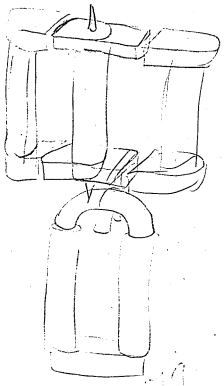
Portland

Portland

Portland

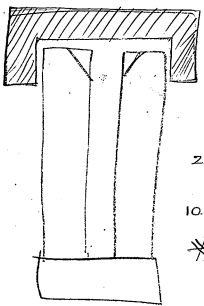
24 1/3

Batt wire —
Back-call wire
Transmitter
Key wire
Switch wire
Bell wire



May V 79

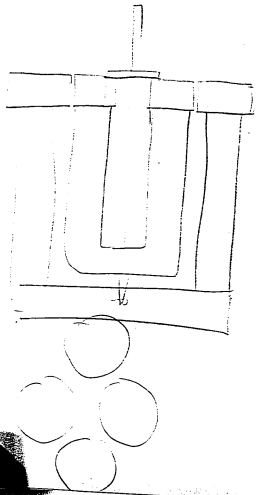
4 60 / 1200 (20
120
00

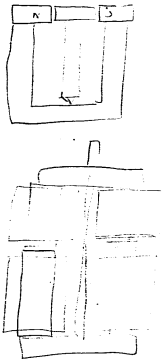


45

20.
20.
2
1000 00
10.

2000
200



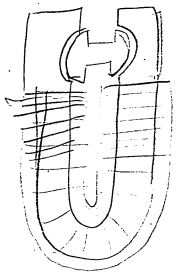

N
S

5000
100
500,000

200,000

Round

5000



75-

300, Round

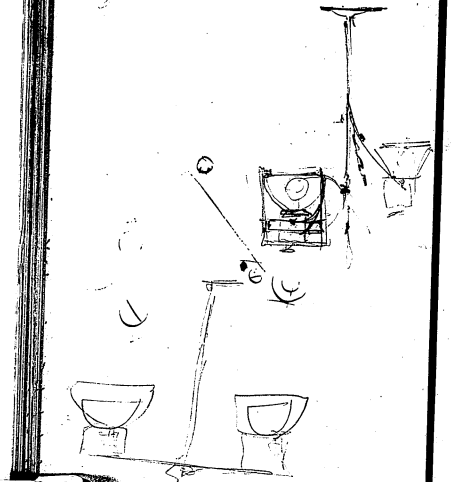
34 1/2

1 15 140, 1½ dozen

6-of 23. 70 70 — 35.

2/10. 35 35 — .35

106



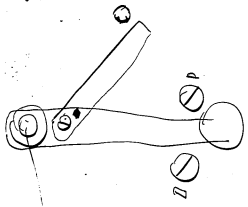
107

3

.9.

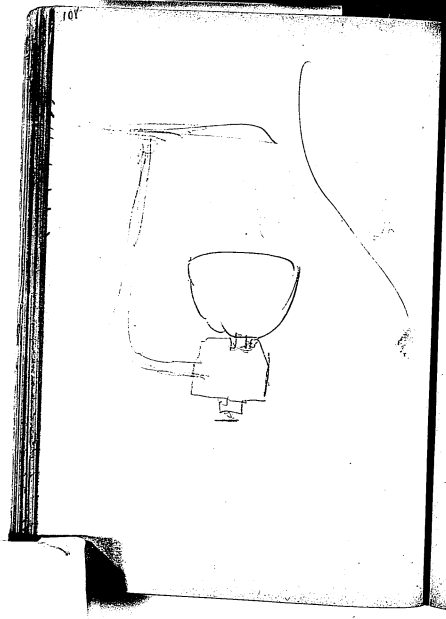
16. 1,140 (9
1,144

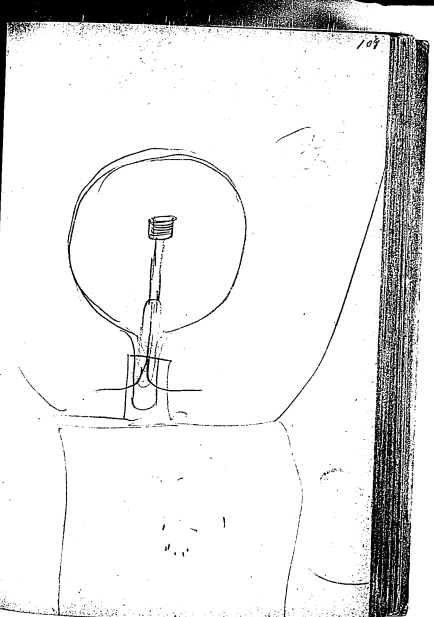
18.

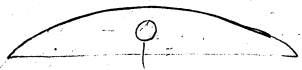


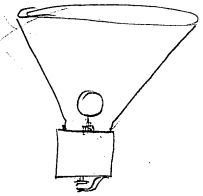
.9.

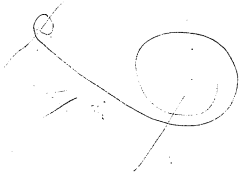
1,74

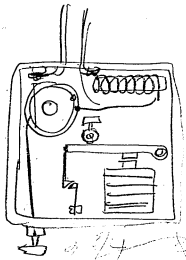


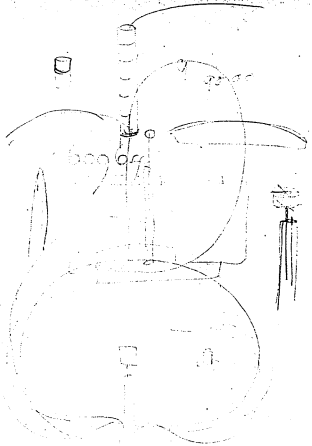


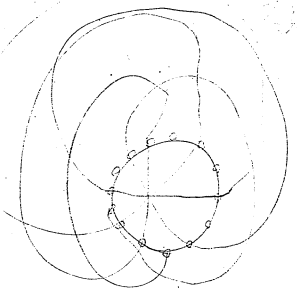


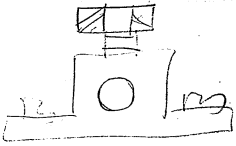








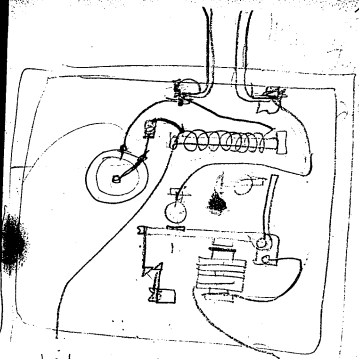




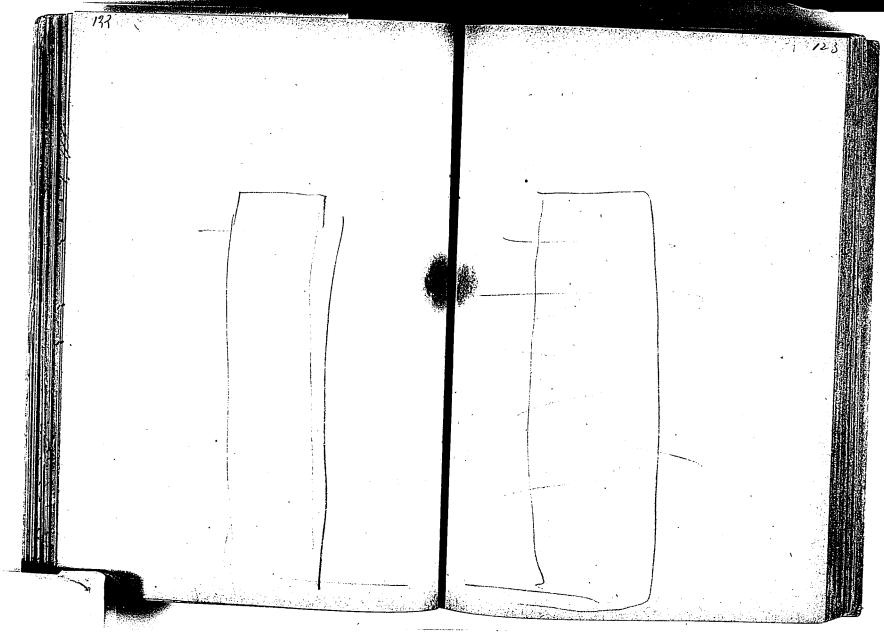
1/100

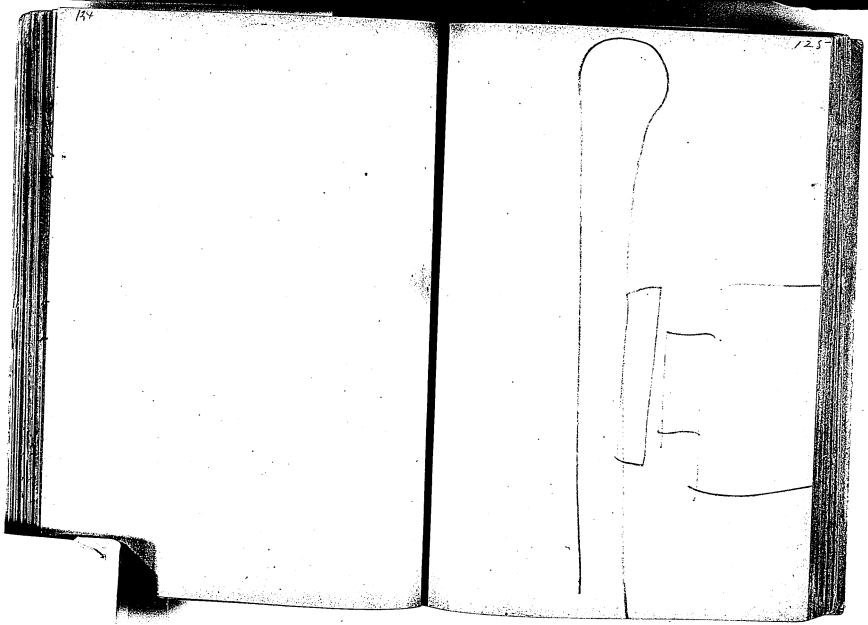
10 × 10 × 9 high

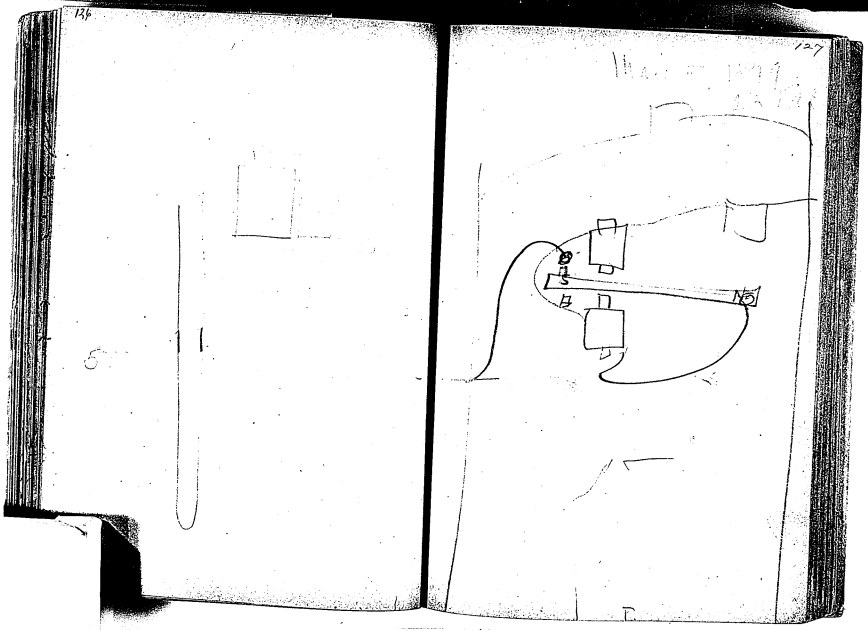
10 ohms.



Small Cistern


122
123


124
125



1000.

1 ohm
machine
250

1 ohm each. -

Then 500 hp Last?

Cost 250. 25000. -

Interest 10 pc 25000 4 years
300 days 10 hours 15000
Loss $15000. - 17500

1000 hp ——— 500 machines

1 ohm

Then 250 hp last

Cost 500 machines 7500.

Interest 10 pc 5000
30 days 10 hours 7500
Cost 7500 12500

1000 hp. 1000.

10 in Each.

~~Each~~ 125 hp Each.

Cost of 1000 hp 100000

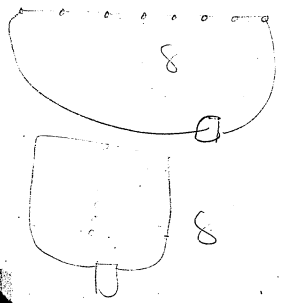
Initial 10 pc 10,000.

Cost 3 750

13 750

$\frac{1}{16}$

20.	1
40	2
80	4
160	8
320	16



$\frac{1}{8}$ of 1 ohm

or 1 of 8

4.

4	16
8	64
16	256

64

25 1/2 Campo

.50

1 12

100
100
10.000
100

80 1/8 = 8 Inches
8 1/8 = 1 inch

100 x 50 / 100 = 5000 / 100 = 50

2 50 25
4 25
8 12 1/2

50 25

5 20
12

2
4
8

Thomas Williams — May 10th 1849

@ Hartshead Wire

Wire for armature —

#22 wire double covered = .95 ohm per ft

#20 wire = 118.5 per 1000 ft

#20 wires 3 together = 355 ft = 1 ohm

#20 wire 2 together = 237 ft = 1 ohm

Diameter Circumference of Shell 27.79 inches

length of one turn 39 inches

Wanted 4 ohms in toto = 948 ft of 2 wires

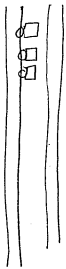
or = 1422 ft of 3 wires

or = 474 ft of 1 wire

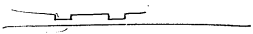
With 5 layers of 13 turns of 3 wires .95 ohm = 901 ft.

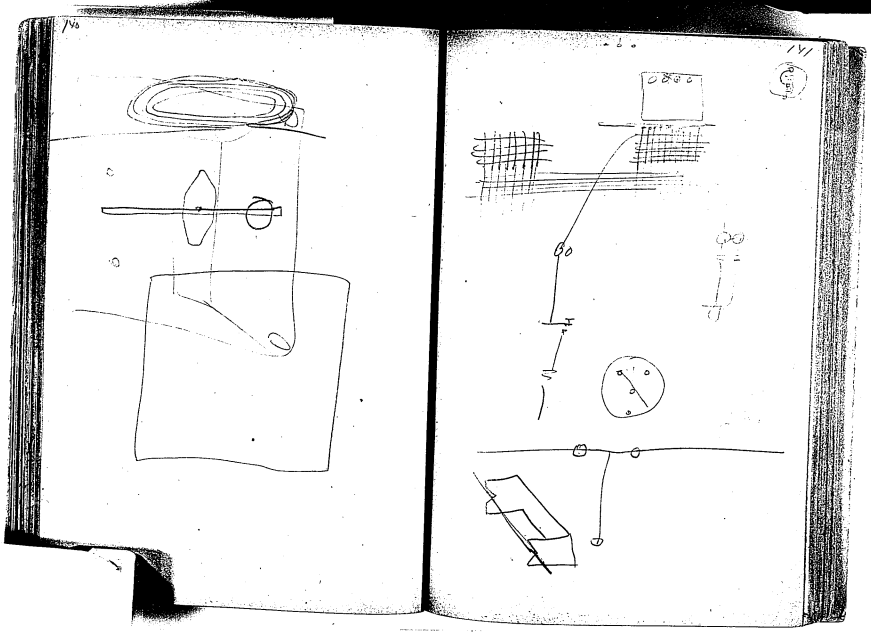
with 29 coils 58 divisions giving .03 for division and .45 in space.

Cut 78 divisions of .31 wide and .3 deep.



44
22
176
264
3/2716
9 0 8
1 8



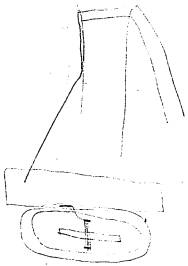


102

103

May 10 1879

Tom



100. unit 10 per year

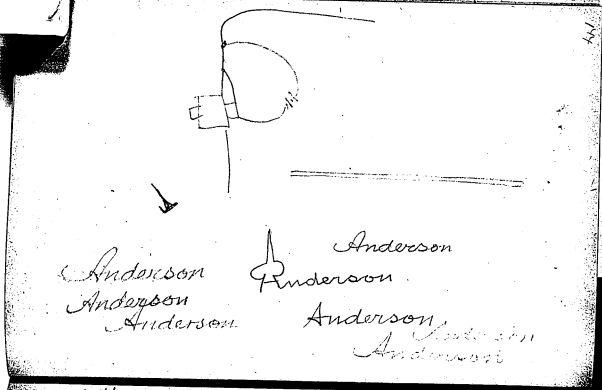
4 hp. [illegible] 140 150

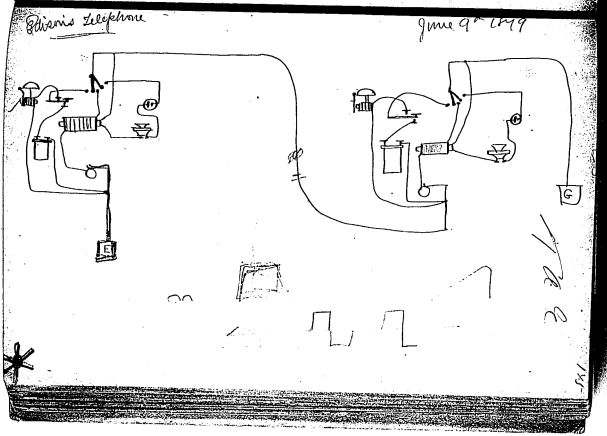
next 2 hp.

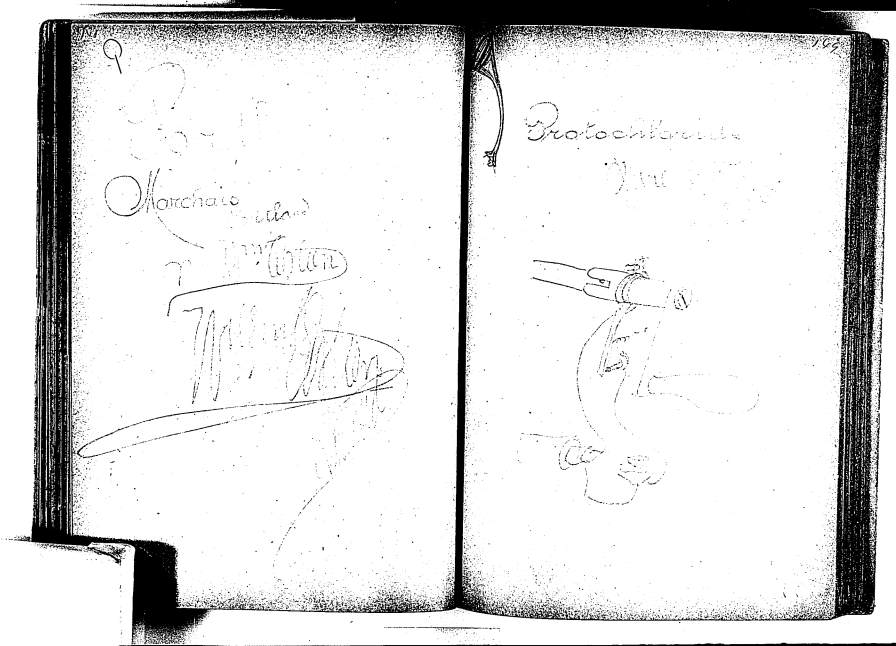
200. 120.

160

3½-


Anderson
Anderson
Anderson
Anderson
Anderson
Anderson
Anderson


Edisons Telephone
June 9th 1879



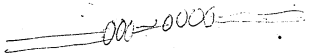
1250

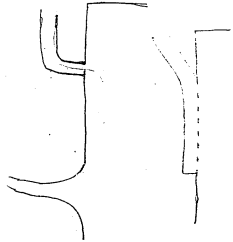
~~2500~~

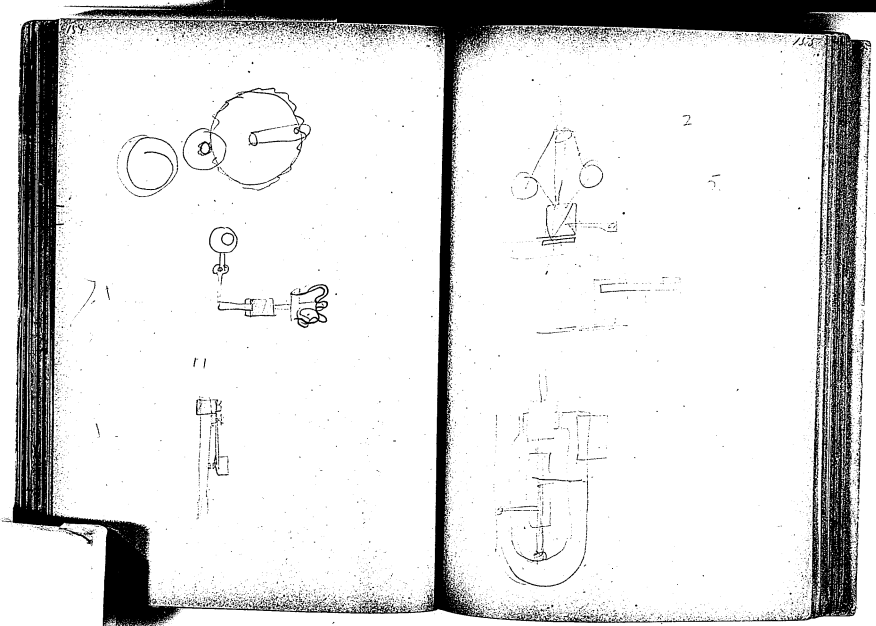
1833
2666
7700
2000
12000
19199

1250

19,199
~~20000~~
17.
125
17
108000







6	Bridg pins complete	15
5	Heads do.	.21
3	Finger Springs	15
3	" "	3
3	Spring washers	15
2	Tuners, Diapasons	20
2	Keys "	50
3	Damper wood rings	6
1	Nuts pieces pallings	60
3	Stems do.	10
1	Keys Springs	50
2	Tuners stopping	18
5	Tuners stopping	45
4	Key Buttons	15
1	Mouth handle	8
2	Keys Pallets	45
2	Tuners "	45
2	Tuning pins	20
3	Keys finished	
8	Rockbutton springs	
3	Rockbuttons complete	2.00
6	Berry mouth pieces	3.00
2		

22

1200
3 1/2
600
3600
Cyl 600

2400
600
3000

1/
1250
1250
1250
3750
3.000
1/25
125
4200

4 1/2
1 1/2
2
6 20

250
250
3.12 1/2
10
$12.50
37.50
15.00
$37.50

365
15
1825
365
5475.

Condenser

1200 H.P.

Condensing engine
allows economy in
pays interest on $5000
in coal alone
when Condenser 2 1/2 lbs per hour
now 3 1/2

$9.600
1200 H.P.
1/3 less Wages of Miller
Roomman
1/3 less depreciation

6 X $200 $12.00

Saving on firemen $1460

Saving in rent

Against this

Extra cost of Non condenser

250 | 8.50 $34
25 20
100 68
408
12

6.80
1200
$ 12 1 60.00

Extra cost of

Depreciation

Cost of piping to be reckoned

32000 Pipe
1280,00 Ends
33.280
11,000

~~Total Extra Expense~~

2.50
1.25
3.75

1200) 3000 (

1200) 375.0 (.31
3600
1500

$12
$16

1200) 1.60 (.0013 1160
1200
400

.13
1600
.016 Oil Water

3650) 5000 (1.4
3650
13500 1.35
10600

1200) 1350 (.11
1200
150

Cost per H. P. per hour

.31 Coal
.13 Labor
.016 Oil &c
.11 Rent
.13
.022 for Repairs
.718

Coal 1½ lbs
for 1200 H.P. per hour
.105 for Water
.75 per H.P. per hour

76000 for
663
$7600

2650) 7600 (2.8
5300
2300

1200) 2650 (1.7
1200
8000

1.7
.17 cts

.17 cts for interest
.10 cts depreciation
.175
.92

Cylinder 14 X 24 inches

14
14
56
14
196
31
196
588
6076

42) 3,038,000 (72.0
294
98
84
140
126
14

12.5

3650

2.38) 2280.00 (958
2142
1380
1190
1900

958) 3650 (3.1
2874
1260

958) 3650 (3.8
2874
7760

3.1
5
$18.60

3.8
8
2

168

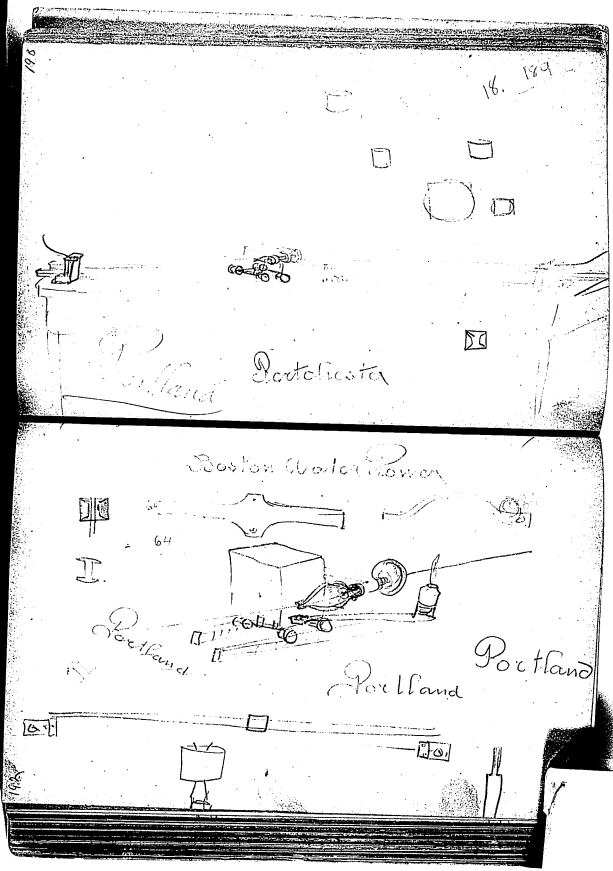
.93
31
.62

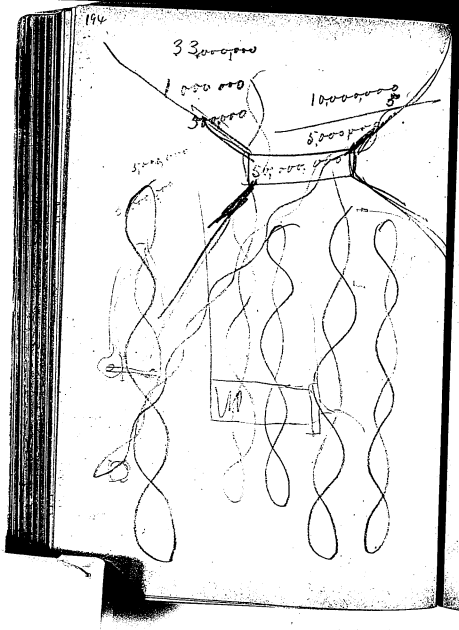
156
3
.468

4.6
.5

2240) 3500 (1.56
2240
12500
11200
14000

169


193
16. 189 -
Portland
Portland
Portland
Boston Water Power
64
Portland
Portland
Portland



~~.042~~

.075
.013
.062
4
.248

.031
.031
31
93
.0009 61
3.1 cu
3844
961
2883
.002981754
1.05
2.5
.0425 Tot Cu

1.82

1.82 .2601
16.6 1.2201
1.4802

30.2

19.8 cu ft in M cont

40.2
29.4
45.2

60
40.8
40.2

~~.097~~

190
14
204) 16.6

1.2201
2.3096
2.9105

8.14%

204
1.4802
2.3096
1.1706

14.8%

1.6042
2.3096
.2946

.6551
.3096
.3455

1.18
16.6
19.6

.0719
1.2201
1.2920

60
19.6
40.4

1.6064
2.2096
1.2968

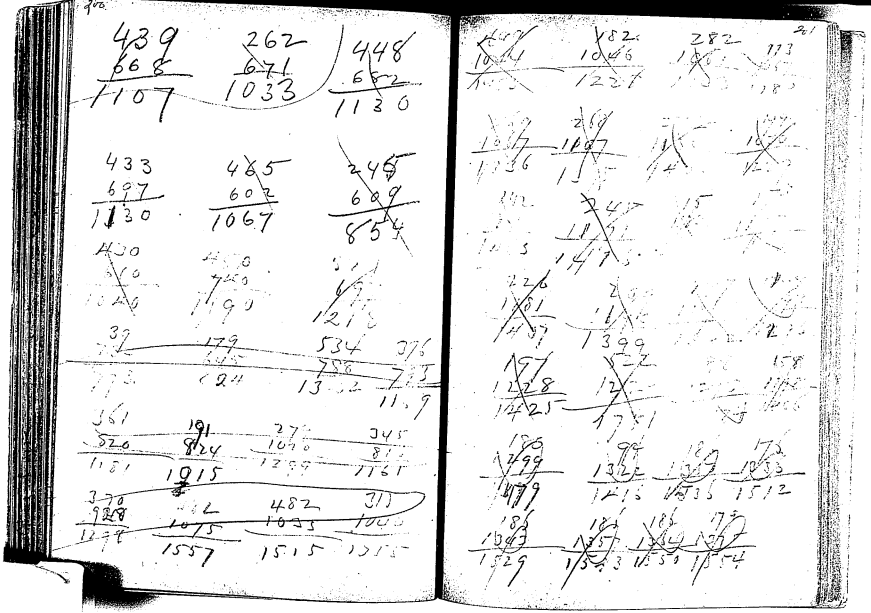
40.
19.6

75 cts.
19.6
55.2

1.7419
2.2096
1.4323

27.1
13.6

28



290 1391 1681

154 1399 1553

170 1403 1573

35 1446 1481

A 1681
B- 1761
1824
1664
1999
1816
1697
1609
1732
1759
1783
1709

159 1404 1563

159 1407 1566

149 1414 1563

336 1425 1761

112 1453 1565

112 1465 1578

112 1478 1589

112 1512 1624

128 1536 1664

482 1517 1999

87 1529 1616

170 1542 1712

143 1555 1698

57 1512 1569

43 1500 1543

30 1562 1592

30 1563 1593

30 1560 1590

24 1566 1590

32 1522 1554

160 1572 1732

15383
1757
17,140
1600
1600
1585

2 1605-9

9 | 15783

10 7/8

2 1/2 inches

~~3/16~~ 3/16 of it 1/3 less in width

---

2 1/2 3/2 again the resistance

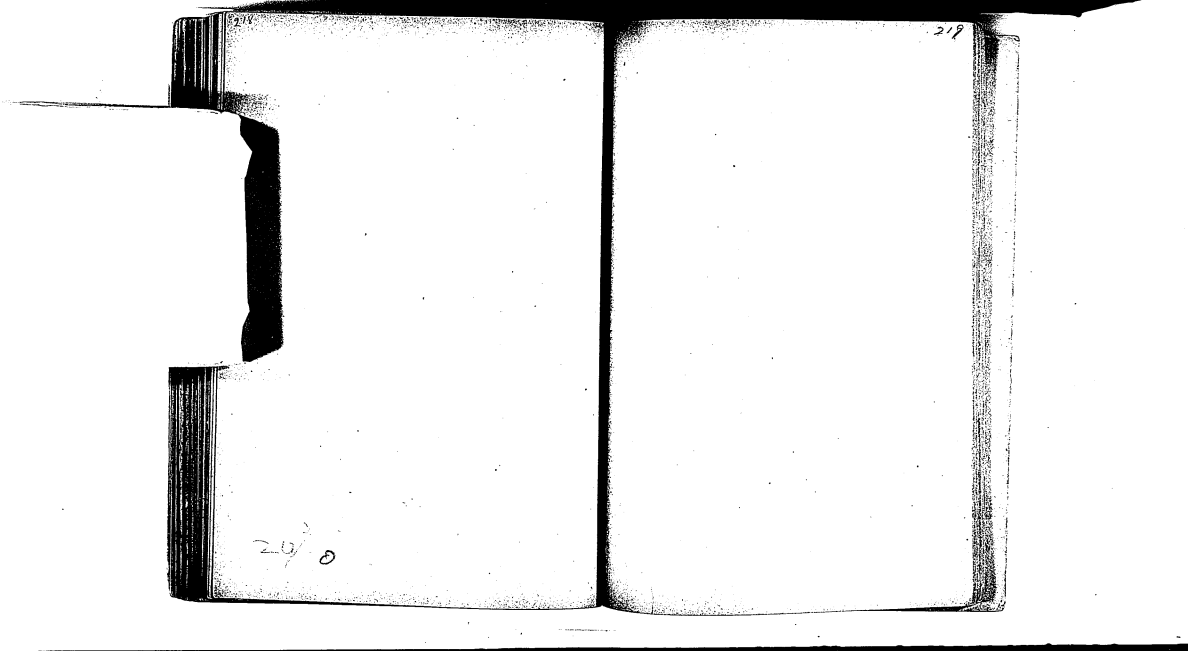
~~3/2~~ 2/3 the surface

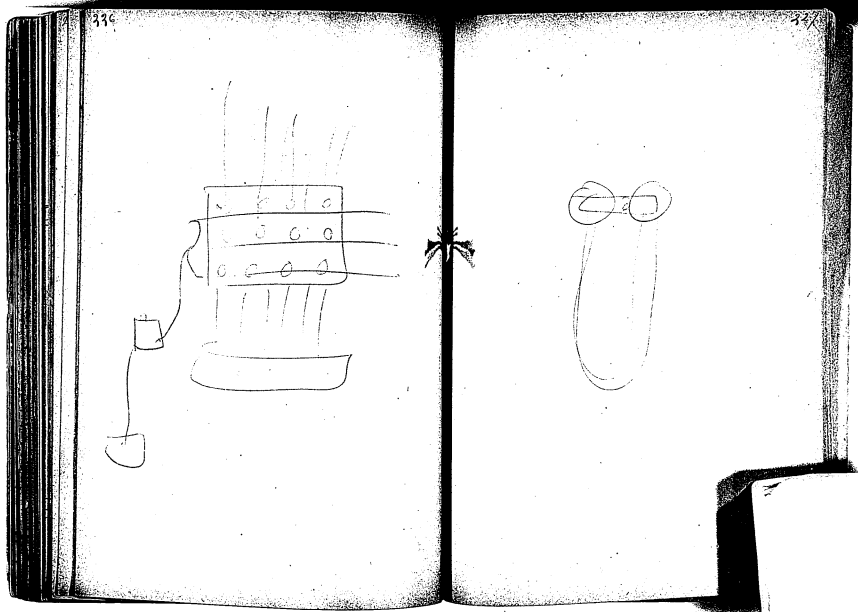
2 1/2 inches

3/2 the energy

3/2 X 3/2 = 9/4 = 2 1/4

2 1/4 times the temperature





To spirals

See Satanic, Nide, and the other Zones from the Nide & water.

5.20	all	1
5.40	1	0

10000 Campos 8 pr H

2 2.5
365
2.35222
2.56223
4.91445

4½ hours
5 hours
$82,100 M
82
$1.00 per M
250,000

$/23
1.36217
2.56223
3.92440

$8,400 Labor

3600 3.55563
Coal 2240 6.64998
5 1.17612
365 2.56223
3.94445

$8,560 Coal

1000 Waste Lite

$/12 1.07922
2.56223
3.64145
$4,300 Executive

$5,000 Rent +

$2,000 Water ?

$6,250 Depreciation 5%

Total $82,100
$35,830
$46,270
$155,000 30%
15,500 10%

3 | 7000
2333
4667

3 | 5500
1833
3667

3867
1.02
7734

7000 2
42500 03
12750

4 hours
$3.21
2400 | 321.00

24000 1.8
7200.00

6 [illegible]

12240

2240 | 3500 | 1.5
2240
1260 0

1250
5 hours
5750

3
2248 | 17250 | 7.7 Tons
15748
1770

3.50
7.7
2450
235
2585.00

284 | 2585 | 10.3
250
85
750
100

$10000 rent

9000) 100000 (11.1
10,000
1,000
365000

14) 20 (1.4
14
60

250
365000
91250
.575 cts
456250
638750
456250
523.687.50

$523

5230

Found $5.00 more on conductor

.575

45 cts
50 cts
5 cts

1.72) 5.00 (.029
3 44
1560

1.72) 1500 (8
1376
124

29
3
87

29
29
319

1560

29
9
261

If 300 H.P can be sold during the day

600
30
18.000 lbs per day

2240) 350.

2.5441
3.3502
1.1939
4.2553
3.4492

.1562 lbs

$28.10
9.33
$37.43

37.43

1.5733
2.3802
1.1931

Cost per M 15.6 cts

If one horse power gives 40 feet an hour

40 X 600 = 24.000

240 M per day at 50 cts

$120 per day
37.43
$82.57

$30.100
15.5.300

19%
3
22%

1.9168
2.5623
4.4791
.1912
1.2879

240
.60
144.00
365
52.500

2,15-84
2.56 23
4,72 07
5.19 12
1.52 85

33.77
9
42.780

240
.75
365

2,38502
2.56 23
4,94 25
1 45 51
4,81 76
5.19 12
1.62 64

42.3
17.
5-9 07/8

600 at Station
400 at Consumer

$150 a year
300 days a years
50 cts a day
5- cts an hour

50 cts a M
~~100 kw an hour~~
100 kw an hour
1 H.P. at Station
240 cu.ft. an hour
6 1/2 H.P. at Station
60 cu.ft. an hour
must be charged for 1 H.P. at consumer
Conductor must be increased
1/2 or $1.25 per lamp
$12.500 more plant

$37.43 cost 600 H.P. at station
10 hours

300 / 125.00 4.0969

41.66

$4.16 Interest 10% on condensator

$37.43

$41.79

18.71

40
600
24000
10
240. M

$120 at 50 cts.

$120
$37.43
$82.57

300
100

60 feet a 50 cts
5.0

3 cts [illegible] an hour hauler

15-5.333
12 5-00
16.7833

1.9168
2.0771
4.7753
9.1692

14 %
3
17 %

1/2 200 H.P. at 50 cts.

7%

200 H.P. at 60 cts. 250 $3 Table

240 M
12 & M
60
$7206
18.71
$53.29
300
15987.00

4.2038
4.7753
2.9791

9.5 %
9
85.5 %

1/2 at 50 cts 7 %
1/2 at 75 cts 16.1

120
300
36000
9
27000

4.4314
4.7753
1.2061

16.1 %
7
17
40.1 %

1/2 at 50 cts 7 %
1/4 at 75 cts 8 %
1/4 at 90 9.6 %

36000
9
324008

16000

4.5105
4.7753
.2858

24.6
.26
50.6 %

4.2553
4.7753
.0306

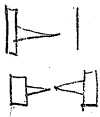
1/2 at 50 cts 7
1/4 at 75 8
1/4 at 1.00 10.7

25.7 %
3
5.77 %

2 10

300 days each year for power

50 cts for M
10 hours a day
3000 hours a year



60 feet

50 1.6990
16.6 1.2291
.4789

3.01 cts an hour

3.00 cts. an hour
Cost 1.18 cts an hour
1.82 profit

3000
5460.00
400
4860.00

50 ct
5 ft. 30
30 cts.

$19,440 profit a year
204.000 capital

204. 1.2878
2.3096
1.9782 9.5

12%

182
17
364
182
2184 0 | 204 | 10.7
204
1440

21.840

60
16.6

1.7782
1.2201
.5581

3.61
2.000
400 120000 6.

.5581
2

3.61
120000
722
361
43.3 20000 = 1.3
204
408
272
2720
680

60
16.6

75 cts
60 cts.

At 75 cts. per M

4.5 cts. an hour
1.18

60 cts.

3.61
1.18
2.43
12
286
243
2816 00000 (13.58
204
776
612
1640

60
50
16.6
3.30
49.8

60
3.00
√ 20
16.8

75 cents per M
is 4.5 cts. for 60 feet
cost of 60 feet

4.5
1.18
3.32 cts

204 | 39840 | 195
204
1940
36

17.3

15.9
9.5
226
48.0
9.5
254

90 cts

6 9 10
90 X 5 = 3/3
75 15 12 8
25 12 7.5
21.5

204 | 25.22
204
482

87
5
6.6
1.18
5.42
6

5.4
1.18
4.2 2
6
25 32

204 | 3252 | 15.9
204
1210
1020
190

$1.00
600

6.48
1.18
4.82
76
204 | 2892 | 14.1
204
852
816
36

14.1
18.6
327

14.1
9.5
23.6
20.5
541.8

204 | 2532 | 124
204
492
408
840

28
24
82

125
75
1.18
6 3 2
6

204 | 377 2 | 18.5
204
1752
1632
120

9.5
28.1

5

9.00 cts.
1.15
7.82

10000 cut
10

204 | 4692 | 23
408
612
40 sq ft

3 | 2240
746
40
29880

24
14,1
381
54
921

3.75
9
3
2
140625

2.25
2.25
5.25
5.0625

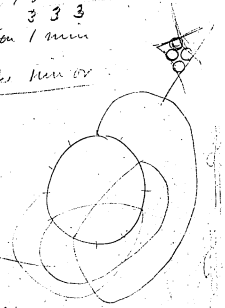
2.25
4125
2.75
5.625

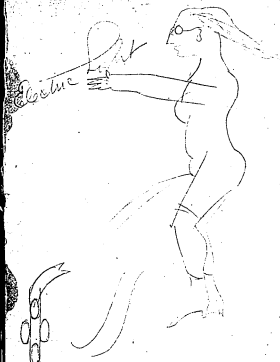
25 - 4 ft

4" x 100 = 2500

33 000 ft on 1 min

333 1/3 pas p. min or



345
345
1554

H 90
90
8100.